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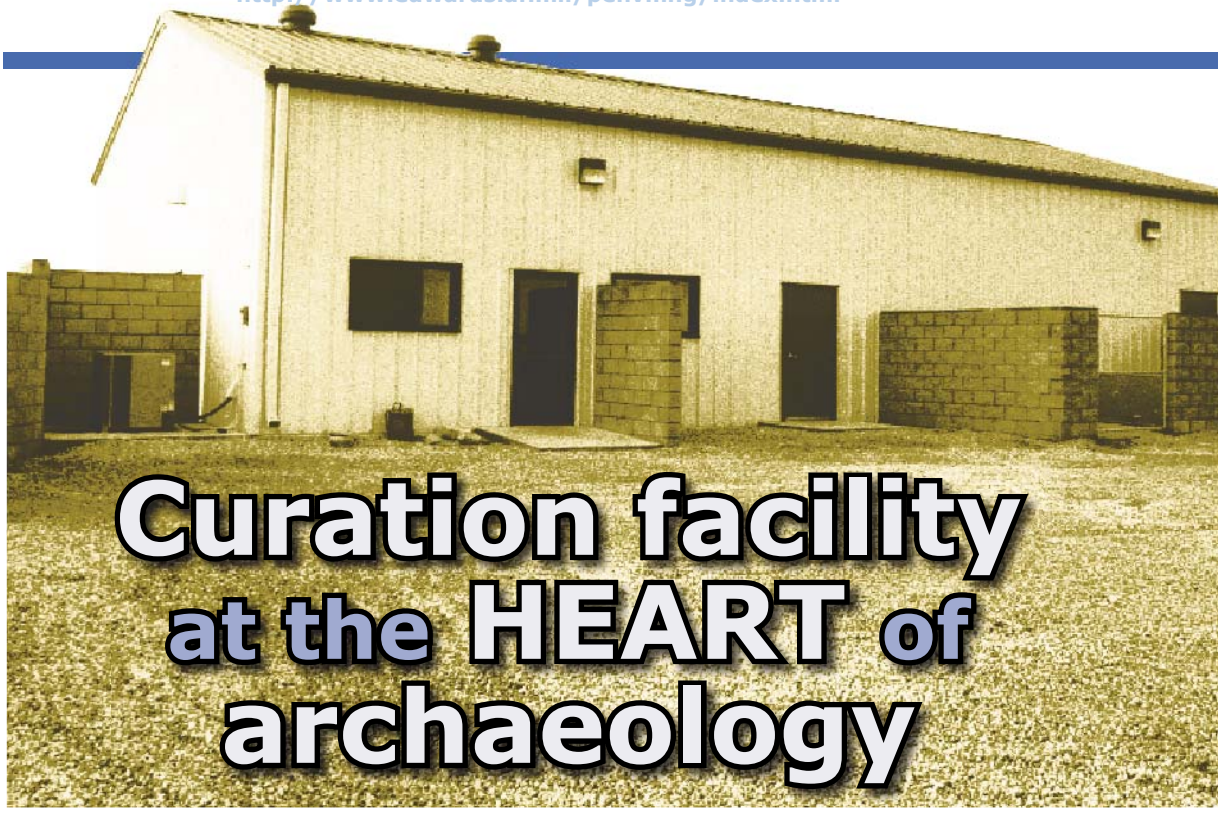
Report to STAKEHOLDERS

http://www.edwards.af.mil/penvmng/index.html



Curation facility at the HEART of archaeology

For archaeologists at Edwards Air Force Base (AFB), work done in the field is distilled under the metal roof of a 2,800 square foot curation facility located next door to the Air Force Flight Test Center Museum just off Rosamond Boulevard. The curation facility is where all the artifacts they find are stored and cared for. It is the central repository for all information relating to cultural resources on base and is used as a clearinghouse for dissemination of information required by the Air Force to comply with environmental laws and for supporting research by archaeologists, historians and others.

"At its core, archaeology is about filling in the information gaps between what is already known and recorded about history and what can be learned from existing physical evidence," said Base Historic Preservation officer Rick Norwood. "The ability to store, access and interpret this new information is the true heart and soul of archaeology."

With over 3,500 prehistoric and historic sites identified on the approximately 301,000 acres that comprise the base, Edwards AFB has no problem filling up the shelves of its curation facility. To date, about 529 cubic feet of artifacts are archived there.

Long-term responsibility

"The work to collect artifacts during cultural resource surveys and excavations doesn't end with finding significant items," Norwood said. "The Air Force has a long-term legal responsibility to store, manage and protect them afterward."

Edwards is not unique in having its own curation facility, he said. Among other bases in California, Vandenberg AFB and the Army's Fort Irwin store collections from their archeological sites in curation facilities similar to the one at Edwards. Smaller bases contract to send their collections to museums or other qualified curation facilities that rent space to them. But these bases still have responsibility to ensure the long-term protection of artifacts housed there, he said. Like all of these facilities, the Edwards AFB curation facility is not a museum and is not open to the public.

The law requires the Air Force to preserve the condition and value of artifact collections

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Stakeholders forum

Q. I've heard that some household products should not be thrown out with the regular trash, but I'm not sure which items need to be set aside. What should I do with the leftover bottles of carpet cleaner and insect repellent I found when I cleaned my garage last weekend?

A. You're right. There are some household products that should not be tossed out for regular trash pickup when it's time to clean them off your shelves.

Although commonly used in the home, products such as carpet cleaner and insect repellent contain corrosive, toxic, ignitable or reactive ingredients. The leftovers of these and other household items — such as paints, cleaners, oils, batteries and pesticides — are referred to as household hazardous waste, or HHW.

Avoid pouring HHW down the drain, on the ground, into storm sewers, or throwing them out with your regular trash. Even unused air freshener, fingernail polish and medications can be dangerous if they are not disposed of in the right way. The volatile chemicals in these products pose a serious threat to the environment and human health when mishandled.

If you live outside of Edwards Air Force Base (AFB), contact your sanitation department or state department of environmental services and ask about local HHW collection areas or events. These departments have more information on how to properly dispose of HHW in your neighborhood.

Communities began offering HHW disposal opportunities in the 1980s. By the late 1990s, more than 3,000 HHW disposal events and programs existed throughout the country, including permanent collection or exchange facilities, special collection days and local business collection sites. Kern County established the Hazardous Waste Information Line at (661) 862-8922. Collection events for Los Angeles County can be found at *http://www.lacsd.org/HHW/HHWFLIER.htm*.

Residents of Edwards AFB should use the Household Hazardous Waste Reutilization program which helps reduce and recycle HHW on base. The program is operated by the U-Fix-It store and acts as a central hub for turning in HHW. If the unused household product is in its original container and not past its expiration date, then it can be issued to another base resident who needs the product (at no charge!). The U-Fix-It store can be contacted by phone at (661) 277-2431.

For more detail about the specific HHWs found in a home, visit the U.S. Environmental Protection Agency Web page at *http://www.epa.gov/grtlakes/seahome/housewaste/house/mainmenu.htm*. The "Virtual House" tour at this site provides an interactive journey of a typical house and the types of HHW that can be found in each room, such as the kitchen or the bathroom. ■

If you have a question about the Edwards Air Force Base Environmental Management program, you may address it to Stakeholders Forum, Attn: Gary Hatch or Miriam Harmon, 5 E. Popson Ave., Edwards AFB, CA 93524-8060, or send e-mail to: gary.hatch@edwards.af.mil

Next RAB Meeting

November 2005
5:30 p.m.
Location and time to be determined

The public is invited.

Report to Stakeholders is a publication of the Edwards AFB Environmental Management Division. Its purpose is to inform and educate the public, base workers and residents about continuing Environmental Management efforts at Edwards AFB. It currently has a circulation of 6,000, including about 2,000 subscribers.

Contents of the *Report to Stakeholders* are not necessarily the official view of, or endorsed by, the U.S. government, the Department of Defense, or the Department of the Air Force.

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Report to **STAKEHOLDERS**

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ZIPPY SIPPER
JT3/CH2M HILL environmental contractors Louis Miles, left, and Darren Knight complete installation of a cleanup system once used by the railroad at remote locations. The new Geotech (GT) solar sipper at South Base removes about one gallon of free-product a day and is continuously reducing a large fuel contamination plume near the South Base runway.

Low-profile cleanup system making quick work of runway contamination

A requirement to keep a very low-profile near the runway is not stopping a new remote cleanup system from making quick work of contamination there. Since installed about one month ago, the Geotech (GT) solar sipper has been removing petroleum-based free product from a monitoring well at a rapid clip. Free-product refers to undissolved liquid, such as found in an oil spill.

"We needed a low-profile free product removal system because of the proximity of the floating product to the South Base flightline," said South Base program manager Rebecca Hobbs. "In two weeks, it removed 12.8 gallons of product. That's about one gallon a day, so far. It's working really well and reducing the continuing source of contamination at a large plume."

The bulk of the new system is located on a trailer within 1,000 feet of a monitoring well near the leading edge of a contamination plume of commingled fuel and solvents at Sites 5/14. The plume extends approximately 5,600 feet southeasterly beneath the southwestern corner of the Birk Flight Test Facility, the South Base Taxiway, the Old South Base Fuel Pipeline and South Base Active Runway 6/24, and ends at the South Base Fire Fighting Training Facility. A pump inside the well is connected by a petroleum-rated fuel line to the trailer where the GT solar sipper is mounted.

The solar sipper is about three feet tall. With the cleanup system atop, the trailer measures no more than five feet high.

Restrictions

"We had to consider the runway clear zone in designing the cleanup system," Hobbs said.

The runway clear zone is an area surrounding the runway and taxiways where nothing can be above a certain height. This prevents the possibility of an aircraft running into and getting damaged by something on the ground.

Contractor JT3/CH2M HILL was tasked with identifying a system that would not exceed the runway height restrictions. JT3/CH2M HILL environmental restoration manager, Darren Knight, spoke to remediation equipment vendors to find, and eventually modify, a system originally developed for railroads to serve remote locations. In designing the system for South Base, he also had to contend with a lack of

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HISTORY'S HOME
Built in 1997, the curation facility sits next door (far left in photo above) to the Edwards AFB Air Force Flight Test Center Museum. It's only a near neighbor though, and is not part of the museum and not open to the public. Objects from the curation facility's collections are loaned for display at the museum, however.

YEARS OF COLLECTING
Below, JT3/CH2M HILL archaeologist Apasara Nicol-Bark examines a 1940's kerosene stove. About 529 cubic feet of artifacts, representing 20 years of archaeological effort, are archived in humidity and temperature controlled conditions at the curation facility.

Curation

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indefinitely, Norwood said. That means they can't simply be stored in crates or railroad boxcars. Instead they require a facility that is temperature and humidity controlled, that protects artifacts and documentation from rodents and pests, and that provides storage where light won't fade or damage items.

Keeping things as they should be in the curation facility is the job of Debi Crosby, a JT3/CH2M HILL contractor with specialized training in curation. Crosby single-handedly oversees all of the operations there and has done so for the past 11 years. In addition to managing the physical facility with all its dos and don'ts to preserve collections, it's her job to organize, manage and track collections; check in and out materials and make sure certain things never leave the facility; keep everything up to date including all site and project data; and facilitate any number of requests for information and materials by researchers, museums, contractors and others.

Information attracts research

About 240 people visit the curation facility each year, completing nearly 400 hours of research, according to visitor records kept by the curation facility.

"Most of the research done at the curation facility involves basic record searches to determine the presence of recorded archaeological sites in the areas of potential effect for Air Force projects or determining what has been previously recorded about a site prior to a phase II evaluation," said Crosby.

A phase II evaluation involves excavation and is a more intense investigation of an archaeological site than earlier phase I surveys in which archaeologists walk the site to identify potential significant finds.

Lots of things attract people to the facility and Crosby's assistance. In addition to the broad range of artifacts found in field surveys and excavations — everything from coins to belt buckles, arrowheads to diaper pins — the curation facility houses records, photos, tapes, CDs, maps and other supporting information such as books and forms.

"The collections at the curation facility provide information on many forms of human activity within the past 10,000 years," Norwood said. "They include tape recorded oral histories of aerospace legends like Chuck Yeager as well as early homesteaders. There are early maps and homestead records and other documentary evidence of what occurred on the land here."

Artifacts and databases

All in all, the collections represent about 20 years of archaeological work to mitigate impacts in accordance with environmental laws. Beyond the value of impact mitigation, the collections acquired in that effort are valuable as research tools to those who wish to compare sites and look at the big picture, Norwood said.

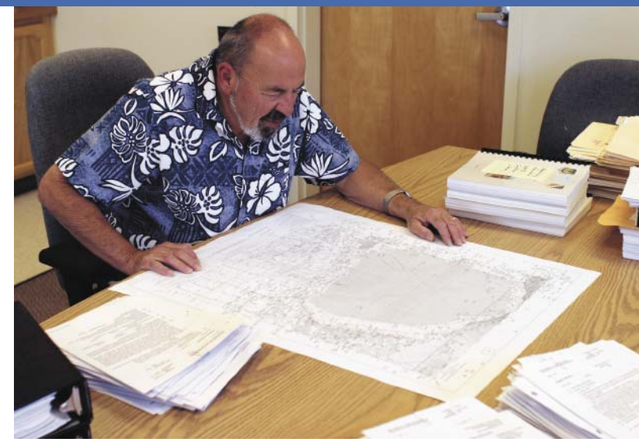
"Information is tied up in the things themselves and how they are related to everything else," he said. "The real information is about the circumstances of how they are found.

"Say you dig here and find something 25 centimeters deep. Then you dig down more and find something 50 centimeters deep. What does that tell you about the relationship between those two things? That they were deposited at different times and that the one that is deeper is quite possibly older. The information about the relationship between different artifacts is as important as the artifact itself. So it's really the information that's stored at the curation facility that's valuable."

Databases, reports and forms record the relationship between things — how deeply they were buried and where they were, above or below, other things — all this information aides in interpreting the whole archaeological record and what people were doing, he said.

"Artifacts are still important in and of themselves," he added. "For instance, an arrowhead can be studied to identify the kind of tools that were used to make it. A researcher would look for characteristics such as surface scars that indicate different manufacturing techniques. To get the big picture, however, a researcher might want to see a series of arrowheads, something like 10 of the same kind but found at different locations. From this, he or she can infer that these might all be the same age and how different sites may be related."

"Not all the artifacts stored at the curation facility are fascinating or rare, but each is significant as part of the overall history of the base. And there's no better place to figure out what that is than at the curation facility," Norwood said. "The curation facility is at the heart of archaeological work at Edwards AFB." ■



MAPS, RECORDS, DATABASES
Archaeologist Rick Norwood consults one of the many historic maps available at the curation facility. What's important is the information about the relationship between different artifacts more than the artifacts themselves, he says.

Researchers of all stripes dig for information at the curation facility

Most often, the curation facility at Edwards AFB serves to provide information important to the Air Force about cultural resource work performed at the base. But every once in a while, the information available there helps others doing research in a variety of fields. Here are just a few examples:

Got paleontology?
A University of California professor visited the curation facility some years ago to review all reports and fossil finds in the area as part of a larger study.

How old is that obsidian flake?
A study of obsidian hydration was performed by University of California researchers in order to refine methods for dating obsidian. Obsidian is a glass-like material widely used in prehistoric cultures for arrowheads, scrapers and similar tools.

What does it look like when nature makes a comeback?
A study of vegetation recovery at 60- and 70-year-old farms and homestead sites at the base was done. The purpose was to determine what happens to land that was cleared many years ago and allowed to recover naturally.

Is there a pattern to poaching?
Interested in a spate of poaching on the base several years ago, the base's Security Forces Wildlife Office asked to examine all the traps that were collected during cultural resource investigations. They wanted to get a more accurate idea of the poaching patterns over time at the base.

SCIENTIFIC INTEREST

Ancient wind-shaped dunes with the curious name of yardang provide information on the what the environment was like millions of years ago.

+ Wind time = YARDANGS

They resemble frozen waves. But these rare dunes were shaped long ago by prevailing winds into what are known today as yardangs.

Yardangs are streamlined, wind eroded, land features carved from strong prevailing winds over many years.

According to JT3/CH2M HILL biologist Mark Bratton, Edwards Air Force Base (AFB) is the best known location in the United States for yardangs, and is one of the three places where these land features can be found in the Western Hemisphere. Overall, there are 16 locations where yardangs are found on earth.

Yardangs might pass for nothing more than a scenic curiosity if it were not for their information value to scientists.

At Edwards AFB, yardangs can tell scientists what the environment may have been like millions of years ago, Bratton said.

Rogers Dry Lake on base has deposit beds of fine gravel, sand, silt and clay. The sand and gravel are predominately quartz and alkali feldspar grains.

It is believed that the yardangs on base were formed at the end of the Ice Age. It was during this time Rogers, Buckhorn and Rosamond Dry Lakes were joined together as a single body of water called Lake Thompson. From the wave action on Lake Thompson, sand deposits formed on the northeastern edge of the lake. As the lake dried up, more and more layers were deposited, forming dunes. Once exposed to prevailing winds, yardangs were formed.

Scientists at NASA found just what they needed in their own backyard with earthly yardangs at Edwards. Since yardangs have also been found on other planets like Mars, NASA was able to test its Mars landrover in simulated ground conditions here.

Yardangs can also be excellent places for paleontologists to look for evidence of ancient aquatic life since the wave action that created them may have washed plant and animal remains and other microorganisms onto these ancient dunes where they were preserved, Bratton said.

The yardangs at Edwards AFB are not open to the general public.

The base's airfield management division has restricted access to the yardangs because of their location on Rogers Dry Lake, which is an active runway, Bratton said.

The yardangs are also off limits when Rogers Dry Lake is filled with water, usually November to May. ■

Cleanup

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electrical power in the vicinity and consider impacts to a nearby old adobe structure. A way to prevent damage to the adobe site had to be found, he said.

"We knew we needed a system that would maintain good product recovery, was suitable for remote locations and could be moved around," Knight said. "Fortunately, the railroad had similar remote location cleanup problems and the GT solar sipper was developed to address them. All we had to do was modify the design to ensure recovery and safe transport to the containment system."

Sipper system

Manufactured by Geotech Environmental Equipment, Inc. of Denver, the system removes floating petroleum product from the surface of the groundwater without removing water. It accomplishes this by incorporating a floating skimmer that repels water. Once placed in the well, the skimmer floats on the water but stays immersed in the product. The skimmer only allows petroleum fuels, also referred to as product, to penetrate and enter the pumping system.

An air-displacement pump connected to the skimmer is placed in the well above the skimmer. During the pump cycle, a vacuum pulls product through the inlet of the skimmer into a pump canister. When the pump canister is full, the vacuum is replaced by positive pressure, which then pushes the product out of the pump, up and out of the monitoring well 1,000 feet to a 55-gallon storage tank.

Solar power controls the pump cycles. The controller operates on 12-volt direct current from the solar panel/rechargeable battery system. The 12-volt power source also operates a small air compressor contained in the control panel. The air compressor provides the source of vacuum and pressure to operate the down-hole pneumatic pump. The controller can be programmed with variable cycle-timer values for the vacuum, pressure and off times. The cycle times are adjusted in the field based on the site-specific conditions such as depth to the product, viscosity of the product and the product recharge rate into the monitoring well. Once set initially at startup and after startup testing, the cycle times should not require significant further adjustment unless conditions at the monitoring well change.

The piping system is comprised of a 3/8-inch gasoline-rated tubing for conveyance of the product and 1/4-inch nylon tubing for air supply. Both types of tubing are contained in 2-inch Schedule 40 PVC. The PVC provides secondary containment in the event of unexpected leakage and protection from the elements.

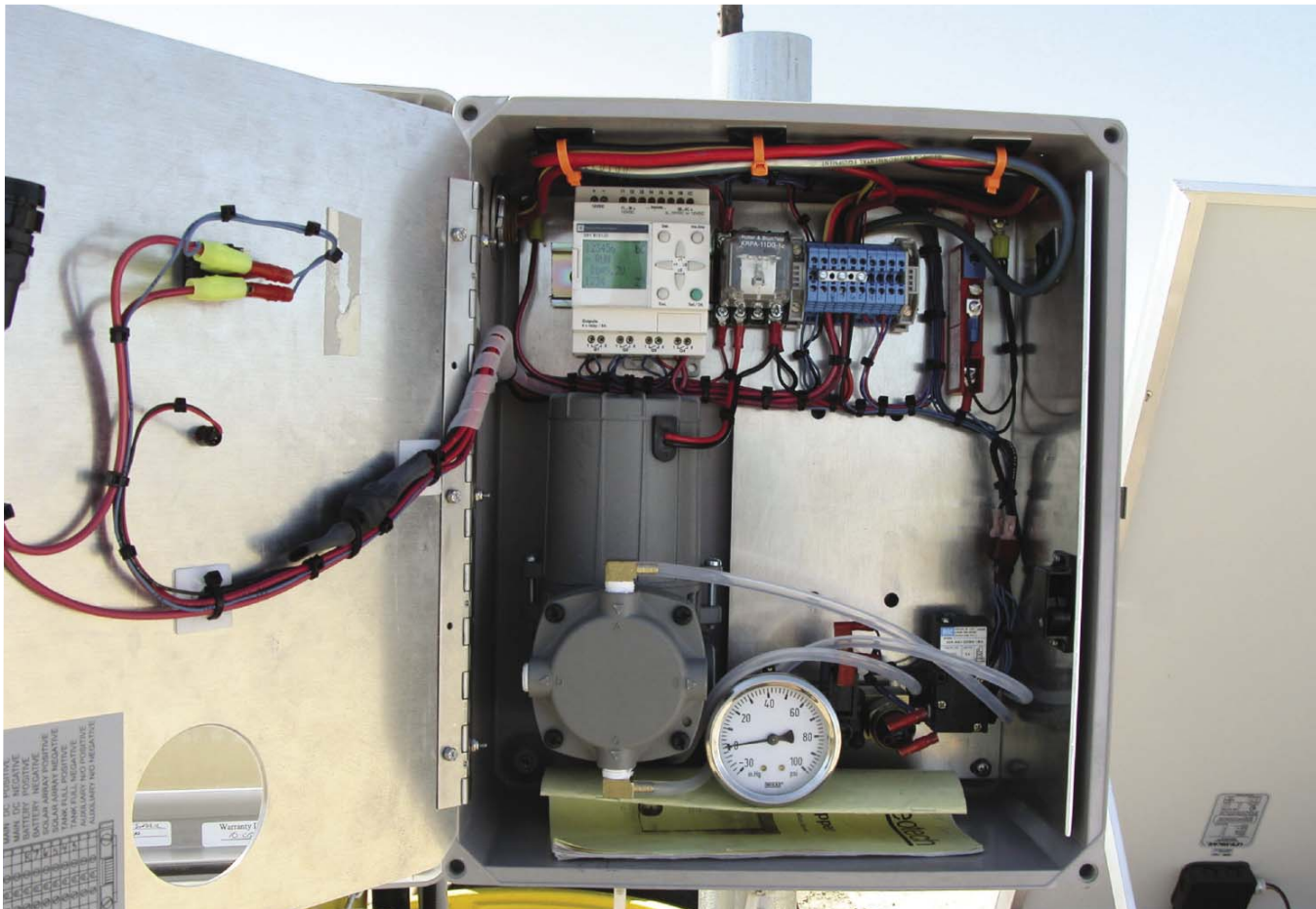
The ability to control the rate of product recovery is a major advantage of the solar sipper over other mobile systems used at the base, Knight said. "It's an inexpensive and simple system that can recover product at a slow, steady rate and that is easily maintained. In fact, all we have to do is pump recovered product into a drum once every four to six weeks."

Three weeks into operation, no problems with the system have been encountered.

"The system has been operating as expected," Knight said. "It is fully contained and it's not impacting the flightline operations. We were able to situate it along old asphalt so it is not disturbing something new. It definitely looks like a winner." ■

EASY ON THE BUDGET

The system controls of the GT solar sipper, pictured below, allow cycle times and rate of flow to be programmed to site-specific circumstances. In addition to meeting runway height restrictions, the system is proving to be inexpensive and simple to operate.



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Published data and documents relating to the Environmental Restoration Program are available for public review in information repositories at four locations. The current information repositories are located in the cities of Boron, Lancaster and Rosamond, as well as Edwards AFB. They are updated when new documents are released.

If you have any questions about information in the repositories, please contact Gary Hatch, Environmental Public Affairs at (661) 277-1454 or through e-mail at gary.hatch@edwards.af.mil.

Location	Days and Hours of Operation	
Edwards AFB Library 5 W. Yeager Blvd. Building 6225 Edwards AFB, Calif. (661) 275-2665	Mon-Thurs Fri. Sat & Sun	9:30 a.m. - 7 p.m. 9:30 a.m. - 6 p.m. 10:30 a.m. - 6 p.m.
Kern County Public Library Wanda Kirk Branch 3611 Rosamond Blvd. Rosamond, Calif. (661) 256-3236	Tue & Wed Thurs-Sat	Noon - 8 p.m. 10 a.m. - 6 p.m.
Los Angeles County Public Library 601 W. Lancaster Blvd. Lancaster, Calif. (661) 948-5029	Mon-Wed Thurs & Fri Sat	10 a.m. - 8 p.m. 10 a.m. - 5 p.m. 11 a.m. - 5 p.m.
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